

REMARKS/ARGUMENT

Claims 21-24, 26-45, 47-52, and 54 are pending after entry of presently Proposed Amendment. Claims 21, 31, 36, and 47 are proposed to be amended to specify that the inter-metal dielectric structure *consists of* the low dielectric constant layer and the inorganic dielectric layer. Claims 45 and 52 are proposed to be amended to specifically recite that it is the combined thickness of the low dielectric constant layer and the inorganic dielectric layer that is 10,000 angstroms. Claims 43 and 54 are proposed to be amended to recite the claimed features in language consistent with the independent claims from which they depend. Claims 46 and 53 are proposed to be canceled.

Applicants are filing this response within two months of the date of mailing of the Final Office Action in conformance with MPEP Section 714.13. An expedited response in accordance with this section is kindly requested.

Claim Objections

Claims 43, 45-46, and 52-54 were objected to because of informalities. Claims 43, 45, 52, and 54 are proposed to be amended to specify the claim features in language consistent with the independent claims from which the claims respectively depend. Claims 46 and 53 are proposed to be canceled. Applicants respectfully request entry of the presently proposed amendment, and that the claim objections be withdrawn.

Rejections under 35 U.S.C. §112

Claims 45-46 and 52-53 were rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. Applicants proposed amending claims 45 and 52 as indicated, and canceling claims 46 and 53. The proposed amendment is fully supported by the written description, and introduces no new matter. See claim 30. Applicants request entry of the presently proposed amendment, and that the claim rejections under 35 USC §112 be withdrawn.

Rejections under 35 U.S.C. §102

Claims 47-48 and 51 were rejected under 35 USC §102(e) as being anticipated by Smith et al. (US Patent No. 6,255,233). Applicants traverse the rejection, and request reconsideration in light of proposed claim amendments.

The Office has identified specific structures or layers in the Smith et al. structure that are asserted to correspond to and teach Applicants' claimed structure as recited in independent claim 47. Applicant herein proposes to amend independent claim 47 to specifically recite that the inter-metal dielectric structure, which is disposed over the barrier, consists of the inorganic dielectric layer and the low dielectric constant layer. The Smith et al. structure is a multi-layer structure having a plurality of layers, exceeding the specified layers of which Applicants' inter-metal dielectric structure consists. The reference therefore does not disclose Applicants' multi-layer dielectric recited in independent claim 47, as proposed to be amended herein. Applicants respectfully request entry of the proposed claim amendment which would place the claim in condition for allowance and patentable over the Smith et al. reference under 35 USC §102(e). Claims 48 and 51 are patentable for at least the same reasons.

Claims 47-49 were rejected under 35 USC §102(e) as being anticipated by Venkantesan et al. (US Patent No. 6,326,301). Applicants traverse this rejection and request reconsideration.

The patent to Venkantesan et al. has not previously been cited in the present application. The reference is further not listed on the most recent Notice of References Cited that accompanied the Office Action of November 2, 2004. Applicants respectfully submit that the patent to Venkantesan et al. is not prior art. The patent to Venkantesan et al. has an application filing date of July 13, 1999. The instant application is a Divisional application of prior Application No. 09/346,156, filed on June 30, 1999. Applicants therefore request that this rejection be withdrawn.

Rejections under 35 U.S.C. §103

Claims 21-23 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang et al. (U.S. Patent No. 6,255,735) in view of Applicants' admitted prior art.

Wang et al. disclose a conductive layer (10) over which an etch stop layer (12) has been formed. A first dielectric layer (14) is formed over the etch stop layer (12), and a second dielectric layer (18) is formed over the first dielectric layer (14). The second dielectric layer (18) is a low k dielectric material that is spin-coated on the first dielectric layer (14). Wang et al. describe the first dielectric layer (14) as formed of a low k dielectric material with a k value of less than 4 (see col. 5, lines 32-35), and the second dielectric layer (18) also being comprised of a low k dielectric material (col. 5, lines 55). The second low k dielectric material is disclosed to require a different sensitivity than the low k dielectric material in the first dielectric layer (14) to at least one etchant chemistry (col. 5, lines 60-63), although it is not disclosed that one or the other layer needs to have the lower of the two low k values.

Applicants herein propose to amend independent claim 21 to recite that the inter-metal dielectric structure consists of an inorganic dielectric layer and a low dielectric constant layer. Wang et al., do not disclose an inter-metal dielectric structure consisting of an inorganic dielectric layer having a dielectric constant of about 4, and a low dielectric constant layer, with the inorganic dielectric layer disposed over a barrier.

For at least the above reasons, Applicants submit that the combination of Wang et al. and admitted prior art do not render obvious Applicants' independent claim 21. Dependent claims 22-23, depending directly or indirectly from independent claim 21 are therefore also not rendered obvious. Applicants request the §103 rejection be withdrawn.

Claims 24 and 26-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang et al. in view of Applicants' admitted prior art as applied to claim 23, and further in view of Usami (U.S. Patent No. 6,077,574). Applicants traverse this rejection and request reconsideration.

Applicants respectfully submit that, for at least the reasons that independent claim 21 is patentable as described above, dependent claims 24 and 26-30, each of which depend directly or indirectly from independent claim 21, are likewise patentable. Applicants request that these rejections be withdrawn.

Claims 31-35 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang et al. in view of Applicants' admitted prior art and Usami. Applicants traverse this rejection and request reconsideration.

Independent claim 31 is proposed to be amended to recite that the multi-layer inter-metal dielectric semiconductor structure consists of an inorganic dielectric layer of un-doped TEOS oxide and a low dielectric constant layer of a carbon doped oxide.. For at least the reasons that Wang et al. fail to render Applicants' independent claim 21 obvious, so too does the Wang et al. reference fail to render Applicants' independent claim 31 obvious. Dependent claims 32-35, each of depend directly or indirectly from independent claim 31 are likewise patentable. Applicants request that these rejections be withdrawn.

Claims 50 and 52-53 were rejected under 35 U.S.C. §103(a) as being unpatentable over Smith et al. in view of Usami. Applicants traverse this rejection and request reconsideration.

Applicants herein propose to amend independent claim 47, from which dependent claim 50 depends, to recite that the inter-metal dielectric structure consists of an inorganic dielectric layer and a low dielectric constant layer. As described above in reference to a §102 rejection, the patent to Smith et al. teaches a multi-layer structure having a plurality of layers exceeding that which is claimed by Applicants and of which the claimed inter-metal dielectric layer consists. The combination of Smith et al. and Usami fail to teach or suggest Applicants' claimed structure as recited in independent claim 47 as proposed to be amended herein. Similarly, the combination of Smith et al. and Usami fail to teach or suggest Applicants' claimed structures as recited in dependent claims 50 and 52, each of which depend directly from independent claim 47. Claim 53 is proposed to be canceled. Applicants therefore request that these rejections be withdrawn.

Claims 50-54 were rejected under 35 U.S.C. §103(a) as being unpatentable over Venkatesan et al. in view of Usami. Applicants traverse this rejection and request reconsideration.

As stated above in reference to a §102 rejection, Applicants submit that the patent to Venkatesan et al. is not prior art. Applicants therefore request that this rejection be withdrawn.

Allowable subject matter

Applicants acknowledge claims 41-44 are indicated to be allowable.

In view of the foregoing, Applicants respectfully request reconsideration of claims 21-24, 26-45, 47-52, and 54, as proposed to be amended herein. Applicants submit that entry of the proposed amendment is proper requiring no additional search, and placing pending claims in a condition for allowance, or at the very least, reducing issues on appeal, should appeal be warranted. Applicants submit that all claims are in condition for allowance. Accordingly, a notice of allowance is respectfully requested. If Examiner has any questions concerning the present Amendment, the Examiner is kindly requested to contact the undersigned at (408) 749-6900, ext. 6905. If any additional fees are due in connection with filing this amendment, the Commissioner is also authorized to charge Deposit Account No. 50-0805 (Order No. LAM1P106D). A copy of the transmittal is enclosed for this purpose.

Respectfully submitted,
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